

Scientific Note

FLOWER-VISITORS OF
BACCHARIS PILULARIS DE CANDOLLE SUBSP.
CONSANGUINEA (DE CANDOLLE) C.B. WOLF
(ASTERACEAE) IN BERKELEY,
CALIFORNIA

Coyote brush (*Baccharis pilularis* De Candolle subspecies *consanguinea* (De Candolle) C.B. Wolf (Asteraceae)) is a dioecious evergreen perennial, native throughout cismontane California, Baja California, and as far north as Oregon (Wright, A.D. 1928. Ph.D. Thesis, University of California, Berkeley). It is a relatively common xerophyte ranging in altitude from sea-level to approximately 400 m, and although it does not compete well in areas where evaporation rates are particularly high, it can withstand seasonal drought stress (Wright 1928). Tilden's (Tilden, J.W. 1951. Microentomology, 1: 149-188) study of *B. pilularis* catalogued the arthropod associates of coyote brush; this initial work, however, did not include the suite of insects visiting the flowers of coyote brush. As a supplementary study, I have provided a list of the insect flower-visitors collected in Strawberry Canyon in 1992.

Large stands of coyote brush exist in the scrub oak communities of Strawberry Canyon (Berkeley, Alameda Co., CA). The two study sites of this project (both approximately 70 sq. meters) were within such plant communities. In addition to coyote brush, both sites had dense populations of *Avena barbata* Pott ex Link (Poaceae) (slender wild oat), *Brassica nigra* (L.) W.D.J. Koch (Brassicaceae) (black mustard), and *Silybum marianum* (L.) Gaertn. (Asteraceae) (milk thistle). The following plants occurred in much lower densities: *Foeniculum vulgare* P. Mill. (Apiaceae) (sweet fennel), *Carduus* sp. (L.) (Asteraceae), *Bromus hordeaceus* L. (Poaceae) (soft chess), *Cirsium arvense* (L.) Scop. (Asteraceae) (Canada thistle), *Genista monspessulana* (L.) L. Johnson (Fabaceae) (French broom), *Eriogonum latifolium* Sm. (Polygonaceae) (buckwheat), *Phalaris aquatica* L. (Poaceae), *Heteromeles arbutifolia* (Lindl.) M. Roemer (Rosaceae), *Quercus agrifolia* Nee (Fagaceae) (live oak), and *Nassella lepida* (A.S. Hitchc.) Barkworth (Poaceae) (needle grass). Soil moisture (% water of a 20cm soil-core) at both sites was approximately 7% during the sampling period. Daytime temperatures ranged from about 16° C to 37°.

During the peak coyote brush flowering period in 1992 (mid-September through mid-October), insects visiting the inflorescences of gynoeocious (female) and androecious (male) coyote brush plants were collected. The pistillate flower of coyote brush is a brush-type flower; the staminate flower is a disk-type. Collections were made on 20 and 26 Sep and 4 and 10 Oct 1992. They commenced at about 08:45 h, paused from noon to 12:45 h, and continued until about 15:45 h. Any insect seen on a flower or hovering directly above an inflorescence was collected using a small net and aspirator. Identifications were done by various specialists, as well as by the author.

Representatives of at least 55 insect species were collected (five orders and 32

Table 1. List of insects visiting *Baccharis* flowers.

Order/Family/(Subfamily)	Genus/Species	No.
Hemiptera		
Cixiidae	undetermined adult	1
Lygaeidae	<i>Nysius</i> sp.	18
undet. nymph		1
undet. nymph		1
Coleoptera		
Coccinellidae	<i>Cryptolaemus montrouzieri</i> Mulsant	1
	<i>Psyllobora vigintimaculata</i> Say	1
	<i>Rhyzobius forestieri</i> Mulsant	1
Chrysomelidae	<i>Diabrotica undecimpunctata</i> Mannerheim	3
	<i>Diachus</i> sp.	3
Staphylinidae	undet. sp.	1
Lepidoptera		
Nymphalidae	<i>Junonia coenia</i> Hubner	1
Diptera		
Agromyzidae	undet. sp. 1	2
	sp. 2	1
Anthomyiidae	undet. spp.	2
Anthomyiidae/Muscidae	undet. spp.	3
Bombyliidae	<i>Mythicomya</i> sp. 1	8
	<i>Mythicomya</i> sp. 2	1
Chamaemyiidae	<i>Leucopsis</i> sp.	1
Muscidae	<i>Coenosia</i> sp.	4
Sarcophagidae	undet. spp.	2
Syrphidae		
(Syrphinae)	<i>Allograpta</i> sp.	2
	<i>Paragus</i> sp.	1
	<i>Sphaerophoria</i> sp.	1
(Microdontinae)	<i>Syritta pipiens</i> (L.)	1
Tachinidae	<i>Chetogena parvipalpus</i> Wulp	2
	<i>Microchaetina</i> sp.	1
Tephritidae	<i>Tephritus</i> sp.	1
	<i>Trupanea</i> sp.	2
Hymenoptera		
Apidae	<i>Apis mellifera</i> L.	11
	<i>Bombus</i> sp.	1
Braconidae		
(Agathidinae)	<i>Agathis gibbosa</i> (Say)	68
(Braconinae)	<i>Atanycolus</i> sp.	1
(Microgastrinae)	<i>Apanteles</i> sp. 1 (<i>metacarpalis</i> spp. group)	9
	<i>Apanteles</i> sp. 2 (<i>ater</i> spp. group)	1
	<i>Apanteles</i> sp. 3 (<i>metacarpalis</i> spp. group)	2
	<i>Apanteles</i> sp. (males) (<i>metacarpalis</i> spp. group)	3
	<i>Dolichogenidea</i> sp. (<i>laevigatus</i> spp. group)	15
Chalcididae	<i>Spilochalcis</i> sp.	1
Colletidae	<i>Hylaeus</i> sp.	4
Eulophidae		
(Tetrastichinae)	<i>Aprostocetus</i> sp.	6
Eumenidae	undet. sp.	1
Eurytomidae	<i>Eurytoma</i> sp.	1
Formicidae	<i>Linepithema humile</i> (Mayr)	80

Table 1. Continued.

Order/Family/(Subfamily)	Genus/Species	No.
Ichneumonidae (Cremastinae)	undet. sp.	1
Platygastridae	<i>Synopeas</i> sp.	66
Pompilidae	undet. sp. 1	1
	sp. 2	1
	sp. 3	1
Pteromalidae (Pteromalinae)	undet. sp. 1	1
	sp. 2	3
Sphecidae	<i>Sceliphron caementarium</i> Drury	1
	undet. sp.	1
Torymidae	<i>Megastigmus</i> sp.	1
Unidentified Chalcidoidea	undet. sp.	5
Vespidae	<i>Vespula pensylvanica</i> Saussure	2

families) including an undescribed *Synopeas* species near *anomaliiventre* (Ashmead) (Table 1.). Particularly well represented were *Linepithema humile* (Mayr) (Hymenoptera: Formicidae), *Agathis gibbosa* (Say) (Hymenoptera: Braconidae), *Synopeas* sp. (Hymenoptera: Platygastridae), Microgastrinae (Hymenoptera: Braconidae), and several chalcidoid species (Hymenoptera). Hymenoptera comprised approximately 81% of all insect specimens, Diptera accounted for 10%, and the remaining orders, 9%. It is worth noting that foraging *A. gibbosa* females frequently probed pistillate inflorescences with their ovipositors. The individual would repeatedly insert its ovipositor into the side of the flower and angle the thrusting motion downward. This behavior was restricted to *A. gibbosa* and usually occurred whenever the wasp was present at a pistillate flower.

Acknowledgment.—The author thanks Robert L. Bugg for support throughout the project (Information Group, SAREP, University of California, Davis). Leopoldo Caltagirone (Laboratory of Biological Control, University of California, Berkeley) provided laboratory space and guidance in the identification of parasitoids. Kenneth Hagen (Laboratory of Biological Control, University of California, Berkeley) identified all Coleoptera as well as providing much support. Paul Arnaud (Department of Entomology, California Academy of Sciences, San Francisco) identified the Diptera. Robert Zuparko (Laboratory of Biological Control, University of California, Berkeley) and Howell Daly (Department of Environmental Science, Policy, and Management, University of California, Berkeley) helped with the identification of some Hymenoptera. Robert Wharton (Department of Entomology, Texas A&M University, College Station) provided the species name of the many *Agathis* specimens. James Whitfield (Department of Entomology, University of Arkansas, Fayetteville) provided the group names of the microgastrines. Author page charges partially offset by a grant from the C.P. Alexander Fund, Pacific Coast Entomological Society.

Shawn A. Steffan, *Department of Entomology, University of Wisconsin, Madison, Wisconsin 53706.*

Received 13 Feb 1996; Accepted 27 Sep 1996.